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THE CENTER LINE

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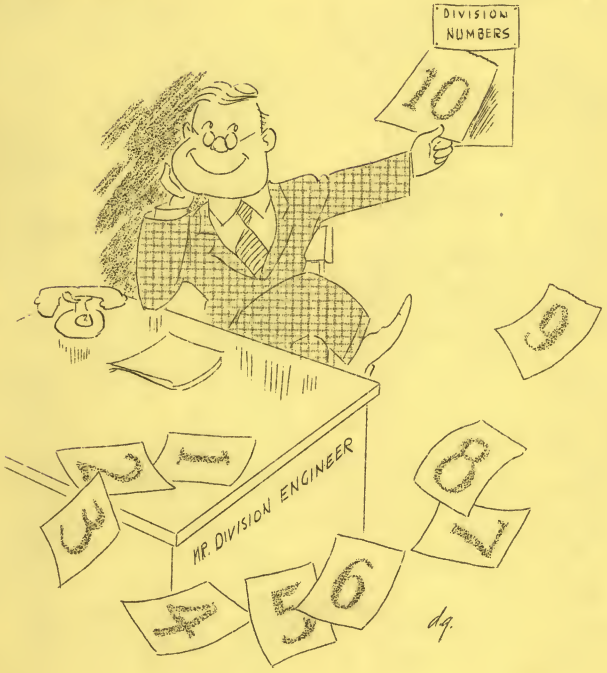

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F O R E W O R D

We, Division Ten, believe that a word of explanation to the reader concerning this issue of the CENTER LINE, the last of the Division Numbers, would not be amiss.

During the past nine months, since the Divisions started editing the CENTER LINE, we have seen our most cherished ideas, etc., for our issue go slipping by one by one as each of the Division Numbers appeared.

In this issue, the last of the ten contributed by the field, we have made a radical departure -- we have gone outside of the Department for the authors of the articles contained in the following pages, not only concerning this Division in particular but the state in general. After the reader has finished with this number, we sincerely believe that he will agree that it has been worthwhile.

To the distinguished gentlemen listed below who so kindly contributed to this issue, we extend our heartfelt thanks and sincere appreciation.

Dr. J. M. Hamilton, former President and now Dean of Men, Montana State College: "Her Majesty, Montana".

Lew. L. Callaway, former Chief Justice of the Supreme Court, State of Montana: "Madison Valley".

Don Anderson, a native son and at present Associate Publisher and Business Manager, Wisconsin State Journal at Madison: "The Gallatin Valley".

Lewis Terwilliger, former Principal of Schools, Livingston, Montana, and a resident of the county for many years: "Park County".

Dr. A. L. Strand, President, Montana State College: "Montana Highways and the State College".

We also acknowledge with appreciation the permission granted by the New Yorker Magazine to reprint a part of their "Report on Tourism".

DIVISION TEN

HER MAJESTY, MONTANA
By

J. M. Hamilton

The 75th Anniversay of the creation of Montana Territory, and the 50th year of her statehood, were celebrated in 1939 with eulogies on the lives of her brave and daring pioneers, and pageants commemorating some of the most thrilling events in here early history. Among the frontiersmen who dared the dangers of the wilderness were men who would have been leaders in any state or nation. Space permits the mention of only a half dozen were in Montana in 1864 and who were active not only during here entire Territorial years, but who lead in the development of Montana state. Granville Stuart discovered gold on Gold Creek in 1858, was United States Minister to Uruguay during Cleveland's second term, and was State Historian at the time of his death in 1918. Conrad Kohrs started a meat market in Bannack in 1862, and lived to become the "Cattle King" of the Northwest, accumulating a fortune in the livestock industry. Sam Hauser, who started the first bank in the Territory, and organized several more, and who, with Andy Davis, financed the big cattle outfits in the years of the great range ranching. Wilbur F. Sanders, who in 1863 convicted the terrible outlaw, George Ives, in a miner's court, and lived to be the first citizen to represent Montana in the United States Senate. William A. Clark, who drove a mule team from Pike's Peak to Bannack, worked a mining claim in 1864, and, because of his genius as a mine operator, became one of the wealthiest men in the United States. Charles A. Broadwater, manager of the famous Diamond-R freight outfit, builder of military posts, the Montana Central Railroad, and his own noted Broadwater Hotel and nutitorium. Other men such as Tom Power, who operated a line of Missouri River Steamboats and was Sanders' colleague in the Senate, and Nelson Story, who drove the first herd of cattle from Texas to Montana, might be mentioned.

When the Chippeway docked at the Fort Benton landing in 1860, she was 3560 miles from a railroad terminal. The Montana Pioneers left all the comforts of civilization hundreds of miles behind them, and traveling for months with ox teams or on crowded steamboats arrived at the new Eldorado.

Never was a territory more appropriately named than Montana. May 26, 1864, when President Abraham Lincoln signed the bill which gave birth to Her Majest, Montana, all of the Whites were in the west half of the Territory, the eastern portion being occupied by wild Indians and big game animals. Beginning in the Wonderland of the Yellowstone and ending in that unsurpassed region of lakes and glaciers, now known as the Glacier National Park, the magnificent main range of the Rockies, adorned with giant peaks looking down on the most charming valleys, crosses the entire Territory. Nor was the Great Continental Divide, in whose haunts the Missouri and Columbia Rivers have their sources, the only superb scenery which Her Majesty has to offer. On the west side, two outlying ranges, the Bitter Root and the Mission, wall in a most beautiful valley and lake panorama. On the east side, beginning with the rugged Gallatin, range after range and pile after pile rise abruptly out of the great plain. The unrivalled Beartooth and Snowy ranges enclose sublime canyons threaded with sparkling mountain streams, the equal of any natural scenery in the great mountains of the West.

These scenic attractions have long possessed an irresistible charm for the vacation seekers in the crowded East and in Foreign countries. The problem has been to provide convenient means of travel to these recreation grounds where tourists may enjoy Her Majesty's unexcelled trout fishing, big game hunting, and glorious sunshine. Today with three transcontinental railroads and many branch lines, with hundreds of miles of hard-surfaced motor highways, practically every spot of interest in Montana can be reached in comfort. Scores of ranches provided with commodious log houses furnished with rustic furniture, and saddle horses with trained wranglers, are equipped to serve the most exacting demands of their guests. To climax an unusually delightful vacation, the "Dudes" are given an opportunity to participate in a real western rodeo, where skillful riders rope steers and mount outlaw bucking broncs. The tourist business nets Montana $25,000,000 annually and is growing steadily.

The most astounding thing in the early history of Montana was the enormous yield of her mines. In ten years after the discovery of Alder Gulch in 1863, Montana's placers had produced $125,000,000 of gold. Marcus Daly named the Butte Hill the "Richest Hill on Earth" and he was correct. From a little more than a cubic mile of the Hill, a third of the World's supply of copper was taken for the fifteen years 1891 to 1905. Montana produced $375,000,000 of silver between 1886 and 1905. During recent years mining has been greatly increased, and has taken on renewed activity. The Government has raised the price of gold from $20.67 an ounce to $35.00. Uncle Sam now buys all the newly mined silver at a considerable premium over the market price. War's and threatened wars have increased the demand for copper, lead, and zinc. Many countries are seeking such metals as manganese and tungsten. The prospects are that Her Majesty will yield a steady stream of the precious and useful metals, and continue to be a great mining state over a long period of years.

Since the early seventies, Montana livestock men have made cattle and sheep ranching a major industry. In 1873 there were 100,000 cattle on her ranges. Twenty years later the number had increased to 1,000,000, and an average of 250,000 beef animals were being shipped to Eastern markets yearly. The hero of the range cattle business was the cowboy astride his well-trained cow pony, mounted on a silver inlaid saddle, with ornamented chaps, a brilliant silk shirt, the whole ensemble topped by a ten-gallon hat. Notwithstanding the inroads made in the gracing lands, the number of cattle have steadily increased and Montana will be permanently a great cattle state. The humble sheepherder and his faithful dog were not spectacular, but they protected from destructive wild anumals and storms on the lonely prairies, flocks of these woolly money makers. The number of sheep reached a maximum of 6,500,000 in 1901, yielding more than 30,000,000 pounds of wool. The influx of homesteaders cut deeply into the grass lands and by 1920 only a third as many could be counted. But the unexpected has happened. Many farms have been turned back to grass, and the range has improved. The agricultural census of 1935 gave Montana almost 4,000,000 sheep with the largest wool crop in the history of the industry in the state. Montana is permanently, only of the leading wool states of the nation.

In 1900 Easterners were worried because they believed that free land in the West was a thing of the past. The overcrowded districts must find new outlets for their surplus population. They were ignorant of the millions of acres of unoccupied farm lands in Montana. During the decade 1900 to 1909, 30,000 homestead entries were filed in Montana covering 4,500,000 acres. But this was only a beginning, for in the eight years

1910 to 1917, the astonishing number of homesteads in Montana amounted to 147,913 which reduced the public domain by 30,306,346 acres. This boom, like all land booms was an evil because land hungry settlers seclected claims that should have been left to the cowboy and the sheep herder. While there have been many failures among these new comers, it must be remembered that during these same years there have been a large percentage of bankruptcies on the boomed farms of Iowa and other equally rich states.

The settlement of Montana's public lands has made Her Majesty a leading wheat state. In 1910 the wheat acreage was 480,000 acres, and the yield 500,000 bushels. The next two years the acreage and bushels doubled. In 1915 2,500,000 acres produced 45,000,000 bushels. Many of our own people will be surprised to learn that during recent years, the bad as well as the good ones, wheat production has made progress, and that in 1928 the crop was nearly 75,000,000 bushels. These large wheat crops have built up a flour milling industry of $17,000,000 a year.

Future progress in Montana's agriculture will depend largely on putting water on the rich bench lands. Bulletin No. 353 of the Montana Agricultural Experiment Stations says that in 1919, 1,620,786 acres were irrigated in our state. A conservative estimate places the acreage that can be irrigated at 3,000,000 when all of our water resources are economically used. Irrigation has created the beet sugar industry which now produces 370,000 tons of beets to supply five factories, twice the amount can be easily produced.

We are living in an age of electricity, Cheap power attracts industries and makes low cost for manufacturing and transportation. Water power is the cheapest source of electricity. Only half million of Montana's 3,700,000 horse power has het been developed. When all of the farms, homes, and railroads have been completely electrified, enough will be in reserve to turn thousands of factory wheels.

Much could be written about Her Majesty's immense coal deposits, the millions of acres of timber lands, and other important natural resources. Buy why continue? With $1,000,000,000 of wealth as a heritage, a climate unsurpassed for health, and the most attractive playground in America, Her Majesty, Montana, salutes Her half million children, and confidently assures them that they are the most happy people in the entire sisterhood of states.

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Ray Minette, Instrumentman on Lyle Swartz's party, was transferred to Ekalaka on March 16th on project FAP 47-B and FAS 347-B.

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Engineer F. M. Brown suggests "...after compiling the material for one issue, we believe that a cover that would be well understood by all ten of the Divisions would show a composite picture of a Division Engineer tearing his hair in an effort to secure articles, etc., for one issue."

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MADISON COUNTY
By
Lew. L. Callaway

Madison County bears a great name. When Lewis and Clark were camped at the three forksof the Missouri, they named the middle stream for the illustrious James Madison, then Secretary of State. They followed the stream they named the Jefferson for the President, the expedition's founder, because they thought that the main Missouri. This brought them eventually to what is now Madison County. In that county they first beheld the famous land mark, called by the Indians the Beaver's Head, so Sacajawea said. It was to mark the division line between Madison and Beaverhead Counties.

They camped one night at or near the site upon which rests the thriving town of Twin Bridges. While camped there they became somewhat familiar with the Philanthropy, variously afterwards called the Passamari (Water of the Cottonwood Groves), Stinkingwater, and Ruby. They must have gone up that stream almost to present Cherokee. They explored the lower part of Wisconsin Creek, which they called Turf because of that substance which was found adjacent to its banks. They explored the Wisdom, later called the Big Hole River. They continued to follow the Beaverhead, thinking it the main stream, to the source of Horse Prairie Creek, one of the two streams which make up the Beaverhead.

The Madison is a great river, its ultimate source being the Fire Hole which rises in the Yellowstone National Park. Montana Route No. 1 follows the river, world famous for its fishing, most of the way from Three Forks to Old Faithful.

Andrew Henry, being unable to maintain the for erected in 1810 by the Missouri Fur Company, on the banks of the Madison River, near Three Forks, because of the antagonism of the Piegan Tribe of the Blackfeed, followed the river to near where Hutchins' Bridge is now; at or near which point his party crossed the river, then going on to Henry's Lake, source of Henry's Fork of the great Snake River. The party spent the Winter of 1811 at the Lake.

The great trail from the Oregon Road to the Bitter Root Valley passed over the northwesterly end of what became Madison County. Over it, as early as 1856, perhaps 1855, adventurous traders drove large numbers of cattle from the Oregon Road to the Passamari (Ruby River) for fattening. Even then it was famous as a wintering valley. People were living there in nomadic fashion in 1857.

Of a sudden there was a great change. Gold. Gold was discovered on Grasshopper Creek, now in Beaverhead County in 1862.

In May, 1863, the Fairweather party from Bannack, on the Grasshopper, discovered Alder Gulch in the Tobacco Root Range. Alder is a tributary of the Ruby River. The western country went wild over the discovery. In the Summer of 1864, ten thousand men were working Alder Gulch itself. It was fabulously rich, said to have been, its size and production considered, the world's richest placer gulch. There were other productive

gulches in the Tobacco Root Range; Brown's, a tributary to Alder; Barton; California; Harris; Biven's; Ramshorn. The country was full of prospectors. Virginia City, the principal town in the Alder Gulch settlement, had ten thousand inhabitants in 1864.

In the meantime, there rose, flourished and passed away, Henry Plummer's savage Road Agent Band. The Vigilantes of Montana, formed by citizens of Nevada City and Virginia City, aided by the citizens of Bannack a little later, were the cause of the elimination of Plummer and his Road Agents and the establishment of law and order in these mountains. The mighty Slade, a honest man who hated a thief, but who was a notorious hell-raiser when in liquor, fell a victim to the avenging company in March 1864. As potent as were the executions of the Vigilantes, was the speech of Wilbur F. Sanders at the trial of George Ives, Road Agent. That speech, heard by thousands, breathed the very essence of American civilization, having a tremendous and lsting influence.

In January, 1864, the First Legislature of Idaho created nine counties in what shortly was to become Montana. One of these was Madison, named for the great river. On February 2, 1865, the First Legislature of Montana continued the county substantially as Idaho had created it, bearing the same name.

Madison County not only contains the Madison River for a long distance, but the lordly Madison Range of mountains to their summit. It is one of the finest ranges anywhere. To the west of the river is the marvelous Tobacco Root Range, wholly within the county. It has produced precious metals, chiefly gold, for over seventy years, and is still producing handsomely. It has been and probably is the richest range in Montana, with the exception of that portion of the main range of the Rockies upon which Butte is situated. The Ruby River, wholly within the county, is a lovely stream. Along its banks, the first pure bred Shorthorn cattle were bred in Montana. For a considerable time it had the two greatest trotting horse establishments in Montana. The county is still a fine livestock country; it still has huge ranges and large farms. The county is rich agriculturally; most of the farms are irrigated and these have never suffered a crop failure. Of course, some have not had water enough. In the north portion of the county, around Pony, locality of great mines, and Harrison, dry farming is carried on successfully.

Generally the people are prosperous. Madison County is a good place in which to live. It was settled by those extraordinary people we refer to as the "Pioneers". They had brains, energy, and daring. These qualties were essential to their progress. They built the Salt Lake Road in Montana which ran from Salt Lake City to Virginia City, and later on to Helena and Bozeman. The Bozeman Road from the Overland and Oregon Roads, running from Fort Sedgwick on the Overland Trail, to Virginia City, through a savage Indian Country was the work of Montana men. In 1865-66 it was the most dangerous road in the world. Through the business acumen and daring of John A. Creighton, then a citizen of Virginia City, later of Omaha, a telegraph line was built in 1866 from Salt Lake City to Virginia City, along the Salt Lake Road. Later it was extended to Helena and Bozeman.

After the construction of the Northern Pacific to Butte, a spur was built to Pony and Norris. Much later the Northern Pacific built a spur from Whitehall to Twin Bridges and, later, to Alder in the Ruby Valley.

Before all that, the Utah Northern, now the Oregon Shortline, had reached Butte, passing along portions of the great trail from the Oregon Road to the Bitter Root, in the northwestern part of the county.

In its early years, the county produced large quantities of beaver and other water animals. Deer, antelope, and elk ranged its uplands and mountains. All these still exist in the county in considerable quantities.

The streams, far from the incursions of the automobile, abound with fish, principally trout. In the mountains are delightful places to camp; there are hundreds of them. Dude ranches and resorts are here and there along the streams and lakes; some elegant, others not; some are designed to furnish "roughing it" to the guests.

Along the Madison River are two great reservoirs; one the Hebgen above the tremendous canyon, and one at Meadow Creek. Meadow Lake, formed by the dam, is a famous fishing body of water.

In the Tobacco Roots are lakes so deep no one has yet found the bottom. Such are some of the Crater Lakes above Virginia City; Cliff Lake and Lost Lake, westerly from Hutchins' Bridge. Great trout live in their waters.

The first public schools were formed in Madison County. It still enjoys a large number, excellent in quality.

But, Madison County's chief treasures are its people, probably a majority of whom have come from the Pioneers. Anyhow, the spirit of the Pioneers has generally motivated them. Madison County gave to other parts of the state their Pioneers, for a great majority of them once lived in Virginia City. Well may Virginia City boast that it is the cradle of Montana's history.

* * * * *

ACCURACY COMES FIRST

(Western Construction News, Feb., 1940)

Surveying is the one element of engineering and construction work which cannot be stepped up to modern tempo to keep pace with corresponding present day speed in such operations as earth moving and concrete placing. Surveying will always remain the art of careful measurement, where initial precision, followed by thorough checking, and possibly double checking, is necessary to produce the assurance of desired accuracy. Mechanical aids to performing calculations may tend to reduce the mental effort and time required for office routine, but the care with which the field work is done and the engineer's design laid out on the site of the job will continue to be a task of exactness, unrelated to speed. Young engineers of today, who emerge from college keyed to the tempo of modern activities are inclined to think of their first work of surveying in terms of quantity. Those veterans of long engineering experience, especially engineers from the ranks of railroad work -- there are many in present day highway organizations -- will evaluate embryo effort in terms of accuracy, and would rather be shown proof that a line or grade had been checked and its correctness demonstrated than to have the same measurement completed in less time with half the assurance of accuracy.... .

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THE GALLATIN VALLEY
By
Don Anderson

(Note: Don Anderson was born, and reared to manhood, in the Gallatin County. He is now associate publisher and business manager of Wisconsin State Journal at Madison. He knows the Gallatin country of Montana. Every summer he returns to it and brings friends who, after the first introduction, need no urging to come again. Mr. Anderson writes as a native and a tourist, too, and knows whereof he writes.)

In Early Montana History, what is now Gallatin County was largely a side issue, a place not to linger if one had a high regard for one's health, a place which had to be gone through in order to get somewhere else. The Frontiersman who sought adventure or pelts or gold was not likely to be very greatly interested in the more solid advantages of agriculture, or the aesthetic aspects of pure scenery. A territory, which was rich by many modern standards, therefore, was passed over in a hurry by many of the first whites who visited it.

The Lewis and Clark expedition passed through Gallatin Valley and the Bozeman Pass in 1806. A party under Captain William Clark, guided by Sacajawea, the famous Shoshone squaw, was bound Eastward to rejoin Lewis and explore the Yellowstone River. Clark's Journal records an abundance of elk, deer and antelope, old signs of buffalo, and "emence quantities of beaver".

The fur of this latter animal was in great demand in the East where fashion dictated that gentlemen of quality wear beaver hats. As early as 1808 trappers worked this region, but great were the hazards from hostile Indians. These earliest Americans understood the meaning of competition and they recognized few fair trade practice laws. They had been fighting over the rich hunting grounds in the Gallatin Valley for possibly centuries, and they desired no outside interference in their family quarrels.

Two years after Lewis and Clark left the valley for good, John Colter and a companion, who were trapping on a stream near the headwaters of the Missouri, were captured by a band of Blackfeet. His companion killed, Colter was stripped and ordered to run across a flat covered with prickly pear. Probably as proof of the theory that a man will run faster for his hide than for his meat, Colter outran the Indians for about six miles. Reaching the Jefferson River, he dived under a driftwood jam and hid from the disappointed Indians until dark. Without weapons or clothes, he traveled east seven days until he reached Fort Lisa at the mouth of the Big Horn River.

The Frontier, which was always a bit short on conversation pieces, doubtless retold this saga so often and with such gusto that it did much to discourage casual travelers from visiting that community unless their business was urgent, and they were willing to put their ability in the sprints to the test.

The discovery of gold near Virginia City in the Early 1860's again put the Gallatin Valley in the limelight. Buffalo had worn a well-engineered trail across the mountains between what is now Livingston and Bozeman. Parties from the East and the South, bound for the mines, found this Bozeman Pass a shortcut and took it despite the fact that it lead them

over Indian hunting grounds. In 1863, John M. Bozeman took the first party through this pass. The following year two wagon trains headed by Bozeman and Jim Bridger, another almost-legendary frontiersman, raced through the valley for the diggings at Alder Gulch.

In the panorama of the years that followed is a sprinkling of road agents, of sheep and cattle wars, and other wild and woolly romancings, which gave a touch of grimness to the already-serious business or earning a pioneer living, but they were only asides and were not life itself, despite what Hollywood may show when it gets around to the job of recording this particular bit of western life.

On the heels of the adventurer came the steadier farmer and stock-raiser and merchant, and it is they who put their stamp on the Valley of the Gallatin and the other territory within the county boundaries. The home-steader found rich, black soil that would support the rural culture he knew in Illinois and Iowa, Wisconsin and Michigan. And better than rich soil was water from dozens of mountain streams, water which was easy to divert and direct through irrigation ditches across the flat valley acres. In a country of limited and uncertain rainfall, irrigation means wealth to farmers who can laugh at droughts that kill other men's crops. This happy combination of rich soil and plenty of water has given the Gallatin Valley a degree of farm prosperity that is higher than that usually found in grain and grass areas. By reason of the extensive irrigation, Gallatin Valley has come to be known as "The Egypt of America".

Rimming the valley are the "Shining Mountains" from which Montana got its name. In them are the great National Forests, created to protect and develop the nation's timber resources. In them, also, are rich grazing lands. In them is a new wealth that the trappers and gold seekers and the farmers who followed them never suspected. "Thar's gold in them hills" and it's the gold of recreation, of vacation relaxation, of fishing and other sports. Its value is growing every year as urban dwellers seek escape from city canyons, or citizens in the flat lands hunt change in the high places.

Strangers are more likely to think of Montana in terms of a lack or water rather than in terms of water, but water is a highlight of Gallatin County. The Gallatin and Madison Rivers are two of the world's great trout streams, and fly fishermen come from hundreds of miles to whip their surfaces for the Cutthroat, Rainbow, Brook and German Brown Trout. The waters of these two rivers, and the Jefferson further west, come together near the Town of Three Forks, in the northwest part of the county, to form one of the world's great rivers, the Missouri. From dozens of smaller canyons, which run into the valley from the mountains surrounding it, are smaller creeks which add to the water wealth of the area (irrigation, sport, power) and on to swell the volume of the Missouri and serve commerce clear to St. Louis.

Gallatin County is one of the world's great granaries. This comes not only from the irrigated sections, but also from the dry land benches where grows hard northern, most famous of wheats. Wheat, oats, rye, barley, buckwheat, and the other grains pour into the elevators to help feed the world. It also is a great grass country. Dairying is growing in importance. More and more farmers are letting their crops "walk to market".

In pioneer Montana, the Gallatin was never as well known as a stock area as were the eastern and northern parts of the state. However,

one of the biggest cattle ranches in the west, the Flying-D is located here. With its hay farms for winter feed grouped around the outlet to Gallatin Canyon, and its grazing lands running west to the Madison River, and south toward Yellowstone Park, the Flying-D is a modern feudal empire. Its range is 15 miles wide and 17 miles long. Its prize herd of Herefords have long been prominent at the International Livestock Exposition. Long trainloads of its beef stock go every year to the hungry abbattoir in Chicago. There is nothing of the synthetic or movieland about this huge modern beef ranch, but the very size of its operations give it a splash of color to be found but few other places in the West.

An important industry which is only about 20 years old is the dude ranch. "Dude" is a term of affection, not reproach. The dude sometimes is a goose, but it lays a golden egg. There are two kinds of dude ranches, the working ranch with Dudes for a sideline, and the variety whose sole purpose in life is to entertain its paying guests. At these ranches the guest, attired in "Levis", flamboyant shirt, gaudy neck-scarf, and the movieland idea of a western hat, rides, fishes, takes pack trips, watches or participates in rodeos, and shakes off as much of the veneer of civilization as possible. They sleep on good beds, and the already-good food, seasoned by the sauce of appetite, acquires a new attraction.

In the Gallatin canyon are a number of well-known dude ranches. Karst's is the oldest, and was a camp and stage station years before the modern dude ranch appeared. Some of them are famous places and have entertained notables from all parts of the world.

Main lines of the Northern Pacific and Chicago, Milwaukee and St. Paul Railroads run through the valley. The Northern Pacific touches most of the urban points. The Milwaukee main line cuts through a part of the county. A branch line of the Milwaukee road runs from Three Forks to Gallatin Gateway, from which point it takes thousands of tourists through Yellowstone Park by busses. At the Gateway it has built a beautiful Inn, which has all the facilities of a good western resort.

Gallatin Way beginning at Bozeman and ending at West Yellowstone, 90 miles distant, and a part of U. S. Highway No. 191, is Gallatin Valley's main connection with Yellowstone National Park. It is graded and oiled throughout. For 14 miles out of Bozeman, to Gallatin Gateway, it traverses a rich region of irrigated farms. For the next 30 miles it winds its way through the narrow canyon of the West Gallatin River, a drive amid scenery of mountain torrent, timbered hills and unscaled peaks as beautiful and impressive as any in the West. Beautiful camping spots, attractive resorts, tourst cabins and dude rances are found at easy intervals along the way to West Yellowstone, the western entrance to the Park.

The county seat is Bozeman, a city of 8,600 population. Here is Montana State College, a division of the greater University of Montana with 1,200 students. It has the State College of Agriculture and Mechanic Arts, and has made important contributions to the commerce, industry, agriculture, and cultural life of the state and nation. Bozeman's most important industries are connected with agriculture, a large pea cannery, and seed pea houses. The desirable combination of warm days and cold nights produces the world's finest peas, and seed peas from Gallatin Valley are the nucleus for the pea canning industry elsewhere in the United States. The city's schools, churches, public buildings, and homes indentify an elightened public spirit and a people who live comfortably and graciously.

Gallatin Gateway, previously mentioned, and West Yellowstone, the western point of entry to the great National Park, are farm and ranch supply centers and tourist outposts. Trident is on the Helena branch of the Northern Pacific and is a cement city. Belgrade, Manhattan, Central Park and Three Forks are on the main line of the Northern Pacific and U. S. Highway No. 10. They were born to meet the shopping needs of the rich farm areas about them, and to provide railroad loading points for the grain crops.

In Bridger Canyon, northeast of Bozeman, is a U. S. Fish Hatchery, which for years has helped to keep stocked the many splendid trout streams in the area.

Southwest of Bozeman are the Spanish Peaks, which rise about 11,000 feet above sea level, and at whose base is a group of typically Alpine lakes. This is in a primitive area and is the goal of the hardy souls who are willing to approach them by the pack horse route. Closer to Yellowstone Park in the Gallatin Canyon land are other lakes. One group of these was stocked some years ago with California Golden trout, and when fishing was opened in them in 1939 they provided a royal sport to those willing to make the strenuous trip to get them.

These are highlights for the visitor who passes through in a hurry. Those willing to browse can find innumerable other points of beauty and interest. Its people are friendly and helpful to the stranger in a way that the crowded East and Midwest do not know. The wave of the hand is as typically western as its silver dollars. The Gallatin is a western jewel, and those who have left it think of it always with nostalgia.

* * * * *

Confucius' son say -- "Old man talk too much."

.....

Our 1940 tourist booklet, "Montana, High, Wide and Handsome," has recently been received from the printer and needless to say we are quite proud of it.

Samples have been mailed to tourist agencies and chambers of commerce in the fourteen states which comprise our largest source of potential tourist travel. This zone includes points which are approximately a three-day drive from Montana, and also has the largest percentage of total motor vehicle registration of any similar zone. A form letter accompanied each sample, stating that we would be glad to supply the agencies with copies of the booklet and our new map, which will be available in a few days, and already the mail is loaded with requests in answer to the letters. Of the 50,000 booklets printed, the majority will be distributed in the above zone, and it is anticipated that they will do much to influence tourists to visit Montana.

All advance indications are that 1940 will be the largest travel year in the history of this country due to the trouble abroad, and Montana is confidentially looking forward to receiving her share.

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PARK COUNTY

by

Lewis Terwillinger

From the time on Tuesday afternoon, July 15, 1806, that Captain William Clark and his party first set foot on what is now Park County, Montana, to the present time, the history of this section of the State of Montana is interesting. Before 1806, so far as known, no white man ever visited this County. After the entering wedge of exploration and discovery, however, the succeeding forty years saw many white fur traders and trappers exploiting the territory. Very little written history is connected with this period of tim as the hardy hunters and trappers were no chroniclers of their experiences. We do know, however, that in the Winter of 1844-1845, Jim Bridger, the noted scout and hunter, spent the whole winter in Emigrant Gulch with a band of Crow Indians. He was therefore probably the first all-winter white resident of the territory now known as Park County.

The Crow Indian Reservation was set apart by treaty in 1851. It included a large part of the present Park County, being all of Park County east of the Yellowstone River and east of Shields River. Of course all of this territory at that time was considered of little value. Notwithstanding the fact that this territory was explicitly granted to the Crow Indians, whites continued to prospect for gold within the reservation. In 1863 gold was discovered in Emigrant Gulch, which was within the Crow Indian Reservation, and a large number of prospectors passing through this territory to the gold fields of Alder Gulch were induced to stop and mine at the Emigrant Gulch mines. In 1865 there had been constructed at the mouth of Emigrant Gulch, about 75 houses, and the settlement was known as Yellowstone City. The settlers were driven away by the Indians who owned the land, but later returned, and it is estimated that at least $300,000 in gold was taken from the sands of the Gulch. Like the other sections of Montana, the first settlers in Park County were placer gold miners.

John Bozeman was killed by the Indians in Park County in 1867, and the site of his death is marked for tourists. In the meantime Hunter's Hot Springs had been discovered, and though it was within the Crow Indian Reservation, the Indians permitted Dr. Hunter to erect buildings and utilize the springs. Until the large hotel building burned down in recent years, these springs was a famous health resort, and decided asset to Park County. In 1868 that portion of the Crow Indian Reservation lying east of Shields River and North of the Yellowstone was taken over by the Government; but it was not until 1882 that the whole Crow Indian Reservation included in Park County was thrown open to settlement.

In the year 1868 and Indian Agency near the mouth of Mission Creek was established and the colony known as Benson's Landing near by was settled. Of course, these places are now in ruins. At this time there were only a few scattered ranchers in the Yellowstone Valley, raising cattle and grazing them on the public domain. It was in 1870 that the mines at and near Cooke City were discovered, and ever since that time there have been recurrent periods of boom and development in this part of the County. It was in December, 1882, that the Northern Pacific Railroad was completed into Park County, and from that time forward the development and growth of this section of the State of Montana was more rapid.

It was in 1865 that Montana Territory established the nine counties then comprising the State. One of these counties was Gallatin, which included what is now Park, Sweet Grass, Stillwater, and part of Yellowstone. These were the times when counties in Montana were larger than some of the eastern states. Park County was created in 1887, and though some of its territory has been taken away to make Sweet Grass, Stillwater, and a part of Carbon County. It has remained a strong well-established and prosperous municipality.

The early struggles of the first settlers, the Indian fights, the privations and obstacles due to the difficulty in securing provisions, and the persistency and perserverance of the pioneers, are matters of history that we cannot describe in this brief paper. One of the things that has promoted the development of the County is its proximity to Yellowstone Park. In 1883 the Northern Pacific Railroad extended its branch line from Livingston to the Yellowstone Park, and this has been a marked factor in developing the Yellowstone Valley. Their later branch line to Wilsall has assisted in the settlement of the Shields River Valley.

It is estimated that of the 2,788 square miles of Park County, about three-fifths is suitable for grazing and stock-raising. A much less portion is suitable irrigable land for agricultural purposes. The County is very advantageously situated, having two rich valleys between mountains. The Bridger Mountains on the west and the Crazy Mountains on the east, bound the fertile Shields River Valley; while the Absaroka Mountains on the south furnish the southern boundary to Yellowstone Valley, the richest and most fertile part of which is known as Paradise Valley. Several peaks in these mountains are over 10,000 feet high. The snowfall, conserved in these ranges, furnish abundant water for the irrigation of the land in the valleys. It is now proposed to construct a dam in the Yellowstone River, four or five miles from Livingston, to create an immense reservoir of water suppicient to irrigate thousands of acres of land, not only in Park County, but in the counties lower down the Yellowstone River. This will be a vast project, and if it materializes it will be a fine supplement to the Yellowstone and Shields Rivers, and the forty or more creeks flowing into these larger streams. Abundant water for irrigation will increase the value of the Park County real estate in a marked degree. The proposed site for the dam is as perfect as nature can make it.

The three principal industries that furnish financial support to Park County are mining, agriculture, and stockraising. The mines at Emigrant Gulch, Jardine, Cooke City, and the Boulder River produce gold silver and other minerals, furnishing much work to the men employed, and dispensing quite extensive sums of money for labor and materials. The coal mines of Trail Creek have produced large quantities of coal for local consumption for many years. The production of grain, hay, and vegetables on irrigated and dry-land ranches has made Park County worthy of a place among the agricultural areas of the State and has increased the wealth of the Yellowstone and Shields River Valleys. The raising of cattle and sheep has been eminently successful at all times, the grazing facilities and the production of excellent hay having made this county pre-eminent in stockraising. The location of the Northern Pacific shops in Livingston has furnished employment to a large number of men for many years, and must be considered as one of the important industries of the county.

In the pioneer history of the County, many towns have sprung up only to be forsaken later. The surviving towns, outside of the City of Livingston, are Gardiner, Cooke City, Clyde Park, and Wilsall, though stores or grain elevators are still maintained at Emigrant, Pray, and Chadbourn. The

hot springs at Chico and Corwin attract many people, especially during the delightful summer seasons prevalent in this section. The Forest Service has arranged very pleasant and agreeable picnic resorts for the entertainment and enjoyment of the people, and the excellent fishing gives sportsmen an ideal place in which to spend the summer.

Park County is one of the most fortunate counties of the State in finances. Owing to the fact that we have had conservative and vigilant county and city officials, the County of Park and the City of Livingston have a minimum of indebtedness, and both are in excellent financial condition. Park County has no bonded indebtedness whatever except the recently issued bonds for the new County High School building completed in 1939. The County and City business has been on a cash basis for many years. The school district comprising Livingston and adjacent territory has no bonded indebtedness, and the City of Livingston has none except for special improvements.

Park County is advantageously situated in regard to highway traffic. U. S. Highway No. 10 passes through the county from east to west, following the Yellowstone River to Livingston, and paralleling the main line of the Northern Pacific Railway from Livingston to Bozeman. U. S. Highway No. 89 traverses the County from north to south, from the Yellowstone Park entrance at Gardiner to the Meagher County line at the northern boundary of Park County. This latter is a very important highway, as it is a portion of the Y-G Bee Line from Yellowstone National Park to Glacier National Park. It is to be sincerely regretted that this road has not been put and kept in good condition for travel. U. S. Highway No. 10 and U. S. Highway No. 89 from Livingston to Gardiner are maintained in excellent condition for travel at all times; but No. 89 from Livingston north has received little attention, though a casual survey would show that it is one of the most important highways of the State of Montana. Park County and the other interested portions of the State have been promised repeatedly that this highway would be constructed and maintained, but delays have occurred, and Park county has been deprived of its comfortable Park to Park travel. It is gratifying to note, however, that proceedings are now under way to establish and construct this road so that it will be a credit to this portion of the State. When completed from Livingston to Great Falls, it will give motorists the shortest and best route between the two National Parks, which is a "consummation devoutly to be wished".

It will thus be seen that Park County is especially endowed with natural resources, a beautiful and picturesque location, and abundant facilities for making of pleasant and comfortable homes for many more people than now reside within its boundaries. Taking all these things into consideration, we might almost feel that Moore had some such locality in mind when he wrote,

"There is not in the wide world a valley so sweet
As the vale in whose bosom the bright waters meet."

* * * * *

MONTANA HIGHWAYS AND THE STATE COLLEGE

By

A. L. Strand, President, Montana State College

Most of us are inclined to take the highways for granted, except once in a while when we think how they used to be. We seldom consider them in relation to the development of institutions or the general affects of changes in transportation on our way of living. It is, therefore, a good thing to discuss the accomplishments and activities of the Montana Highway Department in relation to such an institution as Montana State College.

There are numerous ways in which the State College has been influenced by highway development. The civil engineer, of course, has always been a road builder and since 1913 the only department teaching civil engineering in the Greater University has been here in Bozeman. It is only natural that many of our graduates have found employment in the extensive building of highway s in Montana. It has been more than employment; it has been an opportunity to serve the State in one of its most necessary construction programs and gain the satisfaction that comes from such accomplishments. I cannot name all, but a few who have been or are employed with the Highway Department are: August M. Schneider and Glenn B. Major of the Class of 1921, the latter now being the senior maintenance engineer of the Missouri State Highway Department, John Kohnen, (1920), John N. Morrison, (1927), in the Bridge Department, and many graduates during more recent years. Among these are Henry C. Helland, Andrew L. House, Hobart H. Mahon, Albert G. Pettibone, Neil Sullivan, Reese Humphreys, B. B. Briscoe, and Albert W. Jones. In addition to men who have found regular employment with the Highway Department, a large number of undergraduates have been given work and very good experience during summer vacations.

But the engineering aspects of this relationship have been no more important than several others. I think it will be granted that agricultural extension work was made possible by (1) the model T. Ford, and (2) the progress of road building. Extension work in agriculture consists largely in exchanging ideas. This may be done by the printed work, but personal contact is far more important. Since 1914, county agents, agricultural specialists, and experiment station workers have travelled no less than thirty million miles on Montana roads in their work of promoting agricultural science. If we had a way of estimating the miles travelled by farmers and rachers in attending agricultural meetings, the figure would probably look something like the national debt. It is a far cry from the flapping window-curtains, the mud, the snowdrifts, blowing-in-the gas-tank-to-get-up- a-steep-pitch (backwards) in days gone by, to the heated "showcases", paved or graveled roads, and snow removal within a very short time after a blizzard that we enjoy at the present day. To measure how much these improvements have meant to agricultural work is utterly impossible. One has to have experienced the change that has come about to have any appreciation of it at all. It is very doubtful if the agricultural program of the AAA since 1933 could have been carried out were it not for the improvements in transportation which took place up to that time. Agricultural communities are no longer isolated at any time of the year. Long caravans of farmers studying various demonstrations in soil conservation, weed control, or what-not are common along Montana highways. Meetings can be attended at any time. Distances have been shortened, not in miles as much as in time, and the educational advantages of this to agriculture, and to the college which is trying to serve agriculture, have been very great.

The new highways have facilitated student attendance at college and also visits by their parents. Many students commute many miles daily in order to attend classes. Some have come daily from as far away as Livingston. This, however, is less important than the advantages to those who come by car for hundreds of miles, several traveling together to reduce the cost of a college education. The institution enjoys a closer contact with parents due to easy highway transportation. Bozeman is no longer so far away. Last week the mother of one of the students came from Plentywood to see why her son was not getting along as she thought he should; this would have been out of the question a few years ago. The institution is closer to those for whom it was created.

And then there are the intangible benefits of the highways. Bringing the common school and the district high school, the church, the theatre, and the public meeting closer to the people has had a great effect on all education in this state, and the State College has shared in this. As roads have steadily improved there has been a corresponding change in the use made of them. This has produced effects on our way of living that have come about so gradually we have hardly noticed them. Not only from the standpoint of our material well-being, but also culturally the changes have been marked.

Finally, the new highways have affected our athletic program and relationships. Our football teams have traveled to the Southwest and to California and Oregon during the last two seasons. The band accompanied the team to San Jose last September and played as the official Montana Band on Montana Day at the San Francisco Fair.

Yes, highways have meant a great deal to Montana State College.

* * * * *

At a meeting of the committee on selection of teams held Friday, March 8th, the following players were selected for the various teams in the headquarters league:

Casey Allison	Ben Briscoe	Bill Ashton
Carl Berggren	Sailor Cahill	Don Betzner
Bob Braus	Clarence Decker	Ed Bossler
Lewis Cormier	A. Lyall House	Chas. Bruce
Tom Daly	Chas. King	Frank Cunningham
Morris Griffith	Dale Lince	Joe Davis
Al Greiner	Roy McElroy	Ed Donovan
Norman Hatch	Joe Maierle	Lorin Giese
Ralph Huntington	Don McCarry	Ross Henry
J. H. Morrison	Tom Robertson	Chas. Horan
F. L. Oliver	Geo. Robertson	Bob James
Litle Strong	Toughie Rygg	Bob O'Leary
Buck Shelton	Henry Sherlock	Bob Tash
Bill Weber	J. A. Walton	Ken Tirsell
Ralph Wendland	A. E. Zion	Steve Weber
	Don Gough	Howdy Wright

The first two teams listed have had meetings and chosen Litle Strong and Clarence Decker captains, respectively. Names are yet to be selected. Several changes in personnel are expected because of transfers. More next month.

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DIVISION TEN
by
Fred M. Brown, Division Engineer

When the "Great Architect of the Universe" designed this globe for the habitat of man, He reserved, as an especially favored area, that portion of our land later to be known as Madison, Gallatin, and Park Counties, all contained in the southwestern part of Montana and known, in Montana Highway Parlance, as "Division No. 10".

Into Madison County, the western part of this Division, He poured great quantities of that yellow metal for the possession of which, men gave their best efforts and risked even life itself.

In Gallatin County, the center of this favored section, He placed, for the less adventurous, a beautiful valley rivaled in fertility only by the famed land of Pharohs.

In Park County, the eastern part of this area, He placed a combination of the wealth of the Madison and Gallatin Counties by providing a goodly supply of gold and a valley made richly productive by the waters of the Yellowstone.

To assure sustenance for the seekers of the wealth of this section, He filled the air with an abundance of wild fowl, caused the mountains to abound in wild game, and made the rivers and streams teem with fish.

To delight the the, He made the surrounding mountains of magnificent proportions and adorned them with lakes set like jewels among their ever-vernal trees.

When the inhabitants of the Madison had nearly exhausted its wealth of gold, and found it increasingly difficult to procure, they began to look for a more permanent means of livlihood and a more permanent abode. It was then that they discovered the extensive hay meadows of the valleys and developed these into a great stockraising section, famed for its sheep, cattle, and horses. They extended their explorations into what is now known as Gallatin County and found rich soil so productive that it became necessary to build canneries, grain elevators and flour mills to care for the surplus products and make them available for the people of less favored sections.

Park County was found to be so well adapted for the raising of stock and the production of food stuffs that a large portion of the Yellowstone Valley was named "Paradise Valley".

During the years of development and homemaking the grandeur of the mountains and canyons was a source of joy and relaxation, and this grandeur has been preserved for the pleasure of the thousands of tourists who now visit this section each year to enjoy its well-stocked streams, its lowlands supplied with feathered game, and its mountains wherein is an abundance of the large game animals.

It is well that this portion of our land is of such spectacular beauty and charm for it is the passage way to Yellowstone National Park which

lies immediately to the south.

As the thousands of tourists traveling up the Yellowstone Valley to the Gardiner Entrance view the magnificent Absaroka Range; as they pass through the scenic West Gallatin Canyon to the Entrance at West Yellowstone, feasting their eyes upon the grandeur unsurpassed; and as they journey through Madison Valley Canyon to the Entrance at West Yellowstone, delighting their senses with satisfying natural beauty, they are being prepared for the marvels of the greatest of all Wonderlands, "Yellowstone National Park".

This, then, is "Division Ten", the splendor of which has been made available to mankind by its network of fine highways which have taken the place of the old buffalo and elk trails and the wagon roads of the early days.

* * * * *

Mr. and Mrs. Bob Munzenrider (Laboratory) were the parents of a son born March 26th. The boy weighed 7 pounds, and as far as can be learned no name has been chosen.

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Where, oh where, are those news items from the other divisions?

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As evidence that Center Line gets around we have received a voluntary contribution from May Wellinger Knowles of the Regional Headquarters office of the Public Roads Administration, San Francisco. To quote Mrs. Knowles, "Have been Public Road-ing for a number of years, and thus have come to feel a certain comfortable familiarity with words once foreign to my vocabulary. Attached are a few illustrations and definitions which I am sure new stenographers in engineering work will find most useful. Of course there are others-- the Concrete Cradle, for instance, in which engineers rock their babies to sleep; or perhaps there should be a dissertation on Bedding Courses, which certainly cry out for explanation."

So impressed are we with the lady's writing technique as evidenced by her accompanying letter that we are urging her, nay, even pleading with her to submit further copy and act as our Golden Gate contributing representative.

Incidentally, as noted in the last issue, our series of division numbers plays out with this edition. We believe our inspired method of passing the buck for the past ten months was a dandy, and only regret that our all-wise Commission has not seen fit to create ten additional divisons solely for the purpose of perpetuating the series. We hereby call attention to each division reporter that we expect them to be once more actively on the job. We solicit suggestions for material and contributions from all of our readers.

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ENGINEERING STENOGRAPHER'S HANDBOOK
(Illustrated)

By May Mellinger Knowles

Toe of Slope

This will cost its owner a pretty penny to get unsloped.

Seal Coat

All highway department stenographers know what they are -- but how to earn one at this rate? Roads get them all the time. Any road that is a little lumpy can have a seal coat. Lumpy stenographers look better in them too.

1.

2.

Soffit face

Above is a soffit face young (2) and mature (1). They are found under bridges, just like you find bugs under boards in the garden. I couldn't bear to draw an old soffit face. All are soffit, however.

Extrados

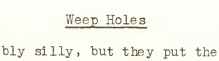
One in the know speaks of extrados curves. I have drawn an extrados of castor oil, however, which is probably much more difficult to model.

Harrowing

Something shattering to the nerves--like a large tabulation of figures, or finding you won't be paid until Monday. Also something engineers do to roads, the beasts!

14-day test

That period which elapses between paydays. Also a frightful ordeal wherein concrete is crushed by a machine. You get squeezed economically, of course.



Weep Holes

It's terribly silly, but they put them in bridges.

M E E T

Our one and only field party is headed by LYLE SWARTZ, Project Engineer, who is currently in charge of FAP 60-B(2) & C(2), Livingston-Clyde Park, since arriving from Jordan in Mid-January of this year. Lyle was born in Wisconsin, coming to Montana at the age of eighteen. After working with the Forest Service a few seasons, he started with this Department as an Axeman in 1926, spending the first six years in western Montana and the next eight in the eastern part of the state; this year the powers-that-be let him return to the land of the shining mountains. Lyle lists a wife, a boy and a girl as exemptions on his income tax return. The other members of the party are H. J. DONOVAN, Instrumentman; CURTIS MCKENZIE, Rodman; and BERNARD (Judge) ANGSTMAN, Chainman.

In the Bozeman Office Division Engineer FRED M. BROWN and Division Clerk DONALD E. BAKER, both introduced in previous issues, hold down one side while on the other is R. B. JOHNSON, Statistical Clerk. Bob, a Nebraska red head of the 1913 variety, worked for the Arrow Aircraft Corporation in that state before flying a plane to this country in 1937--had a slight mishap with a barbed wire fence when leaving the tall corn but came through O.K. (He has 90-odd flying hours to his credit.) Worked for the Bureau of Air Commerce and the Nash-Finch Company before coming to this Department July 21, 1939. Family, including Mrs. Johnson, can't understand his dislike for his middle name, Basil, With a fish pole in his hand he likes to wade about in the local streams.

In the Division Shop we have L. F. HARDIE, Division Mechanic, who appeared in an early issue of the CENTER LINE. Lorn put in two "hitches", in 1921 and in 1923-25, around a convict camp near Bearmouth in the early days of Montana's road building. He escaped from all that, however, getting married (which probably saved him), and now has a son and a daughter. Lorn has been following the Highway game Since June, 1920.

RASMUS C. JENSEN, Mechanic, was born and raised on a ranch near Hall, Montana. Ross, at one time right at home driving four or six pcies spent two years in Alaska before signing up with Uncle Sam at Camp Lewis in 1918, following which he tried mining before starting with the Highway Department in July, 1927, eating crusher dust during the summer and working in the shop in the winter. As a result of his fondness for the latter, he can now be found fooling around the Bozeman Shop. How such a handsome male escaped the laies so long remains a mystery; however, a year and a half ago a red head captured and sentenced him for life.

FRED ROBERTS, Mechanic, spent the years growing up in Colorado and Oregon. Before joining this Department in August, 1927, he put in a shift or two with the Oregon State Highway Department, Fred belongs to that group of hardy souls who laid some of the first oil in the state, and pushed oil crews until 1935 when he was welcomed into the Bozeman Clan of Expert Mechanics. When the shop door is open during the summer, he has to be hogtied as the perfumed essence of hot asphalt curls a beckoning finger at him. Both Fred's

wife and daughter are Oregonians, but he does enjoy the natives (finny variety) of Montana and claims to have dropped a hook into every stream of any size in the state.

D. W. JACKSON, Welder and Blacksmith, first saw the light of day August 10, 1905 midway between the "richest hill on earth" and the new Highway building--Basin, Montana to those not acquainted with the territory. Drew Wi ur (better known as "Cold Iron") cut his teeth on an anvil and used a rock drill for a rattle; at the early age of eighteen was a top-flight blacksmith in the mining game, following that trade until coming to the Bozeman Shop June 1, 1936. He nearly drives the rest of the gang batty with his incessant hammering, but can really make the sparks fly with the arc welder. He is married and boasts two each of sons and daughters, is an ardent hunter and fisherman, but his pet diversion is praising the merits of Henry Ford's product.

JAMES A BROOKS, Mechanic's Helper and Gasoline Distributor, came to Chestnut (then a booming coal minig camp east of Bozeman) from Iowa in 1886 at the age of eighteen months--says Jim. He did everything there was to do around the camp and later spent seventeen years on a threshing rig, coming to the local Shop in 1934. Jim, who is just beginning to get the mechanics to do their work to suit him, is married and there are five little Brooks; if you want to hear them babble just go to any soft ball game around these parts.

WAYNE E. CARR, Night Watchman-Janitor, spent his early life in Missouri and Illinois, but after a few years changed his address to the upper Shields River country in Park County, helping Dad with the stock. Having trained Dad how to handle the stock, Wayne put in four years improving roads for Park County before coming to this Department in 1934. When the local Division shop and office building was completed in the fall of 1937, he took over the night job where his duties are many and varied. He must have at one time or another crossed a corner of Arkansas as he has that slow, soft drawl. His marriage is blessed with one son.

(The Sectionmen are listed in order as to their number of years service with the Department.)

C. F. BRUCKERT, Sectionman, who with the help of NEIL L. HARMON Blades the few remaining handfuls of gravel left on U. S. No. 89 between Livingston and Clyde Park, started with the Department in 1926 with a pair of mules and a borrowed grader. Charley was born in Diamond City just before that famous mining camp folded up, migrated back and forth with his family among several mining camps, grew up and went into the stock raising business which was halted by the well remembered winter of '20-'21. Charley, who has a wife and two daughters, has watched the Department grow to its present place of prominence.

HERMAN H. HELWIG, Sectionman on the Virginia City Hill, is another old timer with the Department, starting in 1927 with a pair of fuzz tails and not giving them up for motorized equipment until 1938. Herman was born in the dust bowl some forty-eight years ago, or before every little windstorm started doing things to the real estate. At the tender age of ten he had a vision of the future of that part of the U. S., so came to Montana by way of Colorado. Herman is a trapper of some renown and is also the father of several young Helwigs.

W. J. BAILEY, Sectionman, maintains the Division's hot spot--U. S. No. 10 between Belgrade and the Bozeman Hill--with the help of JOE MAYKUTH. Judd is a native son, having been born near Ennis shortly before the turn of the century. After spending his early years playing in the saw dust of his father's sawmill, the bright lights of Great Falls attracted and held him for several years. Landing with the Department in 1927, after trying farming, road building, etc., he has been granted leave from this Division only twice--spending two summers as a lay-down man for the State oil crew. Judd has three boys and a girl.

S. A. DAVIS, Sectionman, an Oregonian by birth, takes care of U. S. No. 191 in the upper Gallatin. Coming to the Gallatin Valley at an early age, Stanley spent several seasons with the County road maintainers before joining up with the Highway Department April 1st, 1928. Recently he has evidenced a renewed interest in education, carrying an extra big red apple in his lunch pail for the new teacher at the little log school house on his section. Truck driver WALLACE J. CRAIG chaperons these noon hour tete-a-tetes, the topic of which is not Stanley's four daughters and one son.

AUSTIN BAILEY, Sectionman, is another native, having had his first bath at Bozeman Hot Springs on a bright April morn in 1909. At the early age of seventeen he forsake the pleasant pastime of admiring the resort's many bathing beauties and began short-changing tourists at local service stations. With the advent of metered pumps and cash registers he decided to go to work and has been making a hand with the Department since 1928. In the summer, with the assistance of ROBERT CRAIG, Austin maintains U. S. No. 191 and Montana No. 1 in the West Yellowstone area; when snow begins to fall he hibernates with his wife and small daughter at the Bacon Rind section house, occasionally plowing a bit of snow from the sixty-five miles of road between Karst's Camp and the Montana-Idaho Line at Targhee Pass.

C. W. ENOCHS, Sectionman, admits that Missouri was his birthplace, late in the 19th century. After a try at bookkeeping, punching stakes for a survey crew, and watching others work (foreman) building roads in Yellowstone Park, Charley joined the Department in 1928. He now lives in Wilsall with his wife and, with the exception of a month or two each winter spent in California, smooths out the gumbo (U. S. No. 89 on the map) in the north end of Park County. C. H. BOWEN is the assistant smoother-outer.

TOM WATT, a local product (1909 model), upon graduating from high school in 1928, proudly presented his diploma to Webb Culp (then with the Department) and was awarded four months later with a number two shovel. Tom was given a section in 1932 and now, with the aid of L. G. KENT, maintains the first thirty-odd miles of U. S. No. 191 south of Bozeman. When winter comes, first cutting his hat full of holes and spurining a coat, he mounts a snow plow near Bacon Rind; and, until two years ago, his full red beard flowing in the wind driven snow was a bigger attraction to travellers than the wild game along the road. His present clean shaven mug must either be the result of the mild weather or the influence of a feminine smile--Tom has never taken the vows.

Pony's gift (1907) to the Division was Sectionman FRANCIS PHIPPS who, as a youth, developed a fondness for pie and a shyness of the opposite sex; when fair company came he was to be found hiding under his mother's bed. Shortly after going to work for the Department in 1928, when "boarding out" at Willow Creek, Francis discovered that in order to obtain an extra

piece of pie, he had to be nice to the landlord's daughter. Francis eventually solved this difficult (for him) problem, however, and in the end got both the daughter and the pie. When not playing with his children, a boy and a girl, he can be found keeping U. S. No. 10 in shape between Belgrade and Three Forks. His helper, W. H. (Doc) SOUTH, is now convalescing at home as the result of coming out second best in an encounter with a barrel of road oil.

In the early 1900's there was born in Kansas a future sectionman, P. H. TRACY (just plain Hugh to us); at the age of nineteen the desire to taste the dust of Montana, as kicked up by the business end of a fresno, overcame him--so proficient did he become with one of these ancient dirt movers that contractors were soon bidding for his services, and it was only to stop what might have been a civil war in the Contractor's Association that Hugh finally agreed to enter the employment of the Highway Department, doing so in 1929. Since 1931 he has been dodging traffic on U. S. No. 10 in Park County in the summer and helps the wind remove the snow during the winter. HARRY MISER does the truck driving. Hugh joined the ranks of the benedicts a few years ago, and now has a small daughter to be proud of.

H. L. (Red) MORRISON, Sectionman, celebrates September 12th along with General Pershing; first saw the light of day at Aldridge, Montana in 1899. He spent the biggest part of his life at Miner, Montana where, at the age of three, the education bug bit him and, to the embarrasment of the teacher, he came to school sans clothes but later graduated to a truck seat. In 1930 he joined forces with the Highway Department and can now be seen on U. S. No. 89 near Livingston waving to tourists on their way to Yellowstone Park. GEORGE NEUMAYER does the back work. A rear view will substantiate the name of "Red"--from the front the color is neutral. Likes to hunt and fish and does so when not engated otherwise; married--two daughters.

In 1912, at the age of six, future Sectionman ARTHUR A. ANDERSON (of the Minnesota Andersons) read Horace Greeley's admonition with regard to the place young men should go, and landed in Montana shortly thereafter. Having been around some little time before the triple A was invented, Art cannot be accused of stealing his initials from that agency; however, like the AAA he couldn't leave the chickens alone, messing around the poultry at the State College for a couple of years before taking a breather at the Trident cement plant, winding up with this Department in 1931. Art, who has one wife and one daughter, and JOEL J. CASE keep the holes in the southern end of U. S. No. 89 from getting completely out of bounds.

ROY J. GALLATIN, Sectionman, although born in Illinois, has spent most of his life in this state. When the southern end of Montana No. 1 was being built, Roy boiled the beans and baked the sourdough for many of the crews that did the work. Attempting to act like these men, he learned their vocabulary, thereby developing a dual personality--he is as profane as a mule skinner and as crabby as a cook. C owing his apron he took up road work, landing with this Department in 1933. When not hunting or fishing, at both of which he is very adept, he can occasionally be seen maintaining Montana No. 1 south of Cameron, with JOE WOOD doing the helping. Last summer Roy took unto himself a wife, and since then both his language and disposition have improved.

DICK MARTIN, Sectionman, was born John Richard near Harrison about 1907 and is still there. He does admit, however, to having journeyed seven miles from his birthplace to attend high school at Pony, where he graduated all by himself (after whipping the rest of the kids and some of the teachers). After trying ranch work (the long hours cramping his style) and tinkering with cars in a garage, Dick finally drifted into road work, starting with the Department in 1935. In the meantime he acquired a wife and two young cooks. During the winter months Dick hibernates in one of Madison County's numerous mines, but resumes his duties as Sectionman as soon as Montana No. 1 between Sappington and Cameron requires. FRANK WOIRHAYE does the trucking.

JOHN R. DEADMOND, Gen Foreman, is a product of Last Chance Gulch, and many a politician passed that way before John managed to shake the gold dust from his feet and move out on his own. It didn't take long to take care of what little farm work there was to do in the shadow of the State capitol dome, following which he helped numerous contractors build roads before joining a State oil crew in 1931. In 1937 John was transferred to this Division where his duties as Gang Foreman have been more numerous than the early day nuggets in the place of his birth. Yes, he is married, and the last report shows three little ones.

We would like to add that Division Ten would soon go to pieces without the staunch and loyal support of men like BERT MOORE, KENNETH JONES, N. E. BAKER, MARSHALL PHIPPS, FLOYD SPADY, WILLIAM TEICHERT, to name only a few.

* * * * * * *

Joe Louis (on We, The People) said fighting Godoy had been just like "sittin' in a big easy chair, restin'." Arturo Godoy boasted that after the fight he still had enough left to step out with his wife and "just go do little rumba." Back home, said Godoy to Joe, he had big brothers, "good fighters, too...And don't forget, Champ, next time we fight, you want to watch out."

"What's that," asked Joe, incredulously. "You want to fight again?"

"Yes sir," Arturo announced. "If you want tomorrow, I be there tomorrow." According to the script, he was then supposed to follow up with: "Next time, Champ, I knock you out." But Smoky Joe, swinging clear from the script, beat Arturo to the punch. "Listen, Godoy," Joe said ominously, "I'm gonna give you another chance. And next time you'd better bring up your five big brothers."

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"I" said Adolf Hitler every 53 words; Mussolini every 83 words; President Roosevelt every 100 words; Premier Daladier every 234 words; Prime Minister Chamberlain every 249; -- findings of a Syracuse University student making a survey of their speeches.

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News to many will be the information that the American Indian invented toboggans, snow goggles, hammocks, hollow rubber balls, the enema tube.

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HISTORICAL MARKERS
by
Lewis Gannett

(Excerpts from "Our Footloose Correspondent's Report on Tourism")
The New Yorker Magazine

Historical Markers have, of course, been overdone in the East. There are too many of them--probably because we have had too much history. Often enough they commemorate the most trivial happenings, such as the capture of three scouts by the British in the Revolution; they are written without imagination and in letters which make them impossible to read unless one is driving at an imporbably low speed. New York State and Virginia, which are most notably devoted to historical markers, offend equally in this respect.

Many Western states dispense altogether with history along the roadsides. Texas, however, became acutely history-conscious three years ago, when it held its centennial. Since then an art commission has planted hundreds of historical markers along the Texas roads, calling attention to them by other signs spotted a half-mile in advance. To read the markers, which are tastefully lettered on bronze plaques set in stone, you have to get out of your car, and when you do you are likely to find only a geneological exposition of the name of the particular county which you are about to enter. Oklahoma has a series of large signs explaining the geology of the state in obtrusive terms which a good graudate oil engineer could probably understand, Some chamber-of-commerce enthusiast worded the big signs which spot the Wyoming landscape. They begin with the exclamation "Wonderful Wyoming!"

Montana's road signs are more than signs; they are regional literature. As in Wyoming and Oklahoma, they are designed to be read from the car. And as in Texas and Wyoming, you are forewarned so that you may slow up and read them at your leisure if you like. In Montana the signs are worth reading. Some offer picturesque extracts from the Lewis and Clark journals; one, repeated in various parts of the state, is a pictorial dictionary of common state cattle brands.

The signs are written in the pleasantly informal Montana dialect. One records that "the town of Glendive came into existence as "Queen City of the Cow Land' during the cattle boom of the '80s. In '84, 12,800 'pilgrims' or eastern cattle, were unloaded here in one week to help stock the range. They may have been barnyard stock, but their progeny grew up rough, tough, and hard to curry." Shelby Junction, you read, was once "an oasis where parched cow-punchers cauterized their tonsils with forty-rod and grew plum irresponsible and gala." East of Wibaux you are reminded that "from this end of Montana to the West end is just about the same distance as from New York to Chicago; you have to push a lot of ground behind you to get places in this state." At Junction you are told a bit about Calamity Jane, who "had quite a dazzling social career."

So far as I know, these are the only official road signs in any state of America which dare to be light-hearted or colloquial. They are the best Western promotion material I have ever met. Investigation revealed what might have been expected: they are the work of a passionately patriotic Montanan, Bob Fletcher, of the State Highway Department, who is, like most

Montanans, an Easterner. Came from Iowa thirty years ago. As he says, "Montana hasn't got many grown-up native sons except the Indians, and they use their own sign language".

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TWO MILLION AMERICANS NEVER SAW AN ELEPHANT

(Extracts from an Article by an Unknown Author)

That's why the circus will come back next year. "Same old stuff," says you. Same old animals. Same old stunts. Same old ballyhoo. Maybe a few new frills, but, mainly, the same old circus you saw when you were a kid.

Yes, the same old elephant walks around, but between the time that you saw the elephant walk around this year, and the time when you'll see the elephant walk around next year, two million Americans will have arrived in this funny old world, AND, that is why, year after year, the elephant walks around.

Every year two million babies are born. Every year one million boys reach the girl-crazy age and start shaving the down off their chins for the benefit of a million young women who suddenly become acutely clothes-and-cosmetic-conscious.

And year after year, in spite of everything, two million young folks grow up and get married and start new homes. Every day in every year, new people become interested in ads for diamond rings, electric refrigerators, twin beds, plumber's friends, lawn mowers, baby carriages, high hats and evening gowns. Yesterday they weren't interested. Today they are. Tomorrow other people will be. The girl going away to college is just as excited about finding things to wear as was her grandmother on a similar occasion.

The circus will return, gay, noisy and flamboyant. Throngs of kids will stare with goggle-eyed wonder at that strange new animal, the elephant. Older folks, who never saw a circus before, will conceal their astonishment beneath an air of sophistication. They'll betray themselves with loud laughter when the clowns crack jokes that Noah told the animals in the ark. Is it possible that some people never heard these jokes before?

So the elephant walks around serenely confident that among every blase' group that says, "That's just an elephant," some eager voice will cry, "So THAT'S an elephant!" His benign wisdom seems to apprehend the fact that every year brings two million new Americans who never saw an elephant. The only way to deny these truths is to say, "There ain't no such animal as an elephant."

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Two Center Line editors never saw a news item, hardly.

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SIDE SWIPES

BY PSYNUS

Wm. Wrigley Jr., Boss of the Cuds; no -- we mean Cubs. Well, skip it.

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When "Gone With the Wind" came to the local cinemansion there was a fifteen minute intermission between halves. To double-feature-hardened addicts this seemed a most condescending consideration.

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Our inquiries reveal that there are those who have sat thru two consecutive showings of a double feature bill, and others, who having seen one show have immediately adjourned to another and viewed that complete show. And there are any number who stay for the free feature that follows Saturday night's regular double bill. We idly wonder if our friends aren't being case-hardened to sit thru three grade C's instead of two grade B's.

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And while we are speaking of quality versus quantity, we counted over forty different varieties of "comic" magazines on one magazine rack in a small residential grocery store. We didn't average the death & destruction per issue but suffice to exclaim that it runs into astronomical figures.

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The Census Advisory Committee, a group of Non-Government experts sifted out thousands of proposed queries such as: "Do you own a Bible?" -- "Are you over 6 feet tall?" and "If unmarried, are you a virgin?" Questions about mortgages were asked as early as 1890, detailed information about financial status was demanded in 1850-60 & 70. "How much rent do you pay?" was first asked in 1930.

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"The Drunkard", written a century ago, is a grim preachment against the evils of drink. Its burlesque version has passed its 2440 performance in Los Angeles. Between hissing the villain and cheering the heroine, the audience has consumed a million and a half bottles of beer, 25 tons of pretzels.

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"Philip" looks roughly like a child's hobbyhorse but is mounted on eccentric rockers. The secret of his popularity is that he looks easy to ride but really isn't. By rocking gently back & forth, bringing up the hind legs, certain progress can be achieved. Novices invariably rock too hard, especially when taunted into a race, thereupon fall in a heap. Most expert riders are Jack Benny and Judy Garland; one of the worst -- Harold Lloyd, Philip's sponsor.

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Henceforth His Majesty's Government, when it needs more millions, will simply ask the House to appropriate "tokens" nominally of £ 100 ($400) -- each token to stand for whatever vast sum is secretly decided by the War Cabinet.

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Manager Ethridge (Louisville's Courier-Journal): "For a long time daily newspapers have been magazines, running largely, though, to the light and comic type. We are going to put more weight and bulk into the Courier-Journal in the belief that America has passed her adolescence, and readers are willing now to learn the facts of life."

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Boogie-woogie is a kind of blues piano playing in which the left hand drones a set bass phrase over & over, while the right hand goes to town with whatever variations the player can think up. Its form is identical with that of the classical passacaglia, a kind of dance music (of Spanish origin) that was old stuff to Bach's grandfather.

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When the gas alarm sounded during a demonstration of trench digging and barbed wire work, Minister Stanley & brass hats complacently watched the soldiers clap on masks as a white cloud rolled across the field. When the cloud reached them, Minister Stanley & brass hats broke for shelter, eyes streaming. The gas was real.

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Called to the colors was Prince Fumitaka "Butch" Konoye. Son of able Prince Konoye, "Butch" captained Princeton's 1937-38 golf team, flunked completely and cheerfully out of college, became dean of a Japanese college in Shanghai. He will serve as a private.

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A universal commodity like soap has to be sold in heroic amounts to make money, and, unfortunately, there is little to choose between soaps. Hence competition is nerve-racking, with Proctor & Gamble hanging on to some 40% of the U.S. business, C-P-P and Lever Bros. doing about 20% apiece, 200-odd soapmakers scrapping for the rest. Chief competitive weapon: advertising, for which the soapmakers' bill was a cool 40 million last year. Annually Americans scrub themselves and belongings with some 24 lbs. (equal to 110 toilet-size cakes) of soap apiece. Next come the Dutch, two pounds under the U.S. record. The hot-water-bathing Japanese did no better than six cakes of soap apiece.

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Broadcaster Dryfoos operates on regular schedule, blows a police whistle to remind his audience of starting time. Over the dormitory air he conducts morning and evening news programs (H. Dryfoos, commentator), a local Pot O' Gold program (prize, 50¢), sometimes polls his audience with; "The first six guys in my rooms get free chocolate malteds." He also invites faculty guest speakers, fills in with programs of popular records. Under the magisterial eye of Dartmouth President E. H. Hopkins, Broadcaster Dryfoos has to avoid records like Bruz Fletcher's "Nympho-Dipso-Ego-Maniac" or "She Had to Go and Lose It at the Astor". Keep it clean, the administration warns him.

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March is the month in which Hitler took back the Rhineland, annexed Austria, subjected Bohemia-Morvii. The Fuhrer's faith in March is said to be bolstered by five personal astrologers. But recently he unaccountably outlawed astrology in the Reich.

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Superman's irresistible strength came up against the impenetrable wall of Canadian censorship, and one day last fortnight there was no Superman in the Toronto Star. While Star gazers wondered what Superman was up to now, U.S readers saw him snatch Blitzen's dictator, Rutland's "war-mongering" commander, set them down in no-man's land to fight it out alone, while disgusted soldiers of both armies laid down their arms, went home to their spring plowing.

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The U.S. contains nearly 45,000 orchestras devoted to playing classical music. Of these more than 250 are full-fledged, permanent symphonic organizations. Of the 250-odd, 16 are big league orchestras (with a budget of more than $100,000 a year), rivaling the best in Europe. Of the 16, three (New York Philharmonic-Symphony, Boston Symphony and Philadelphia Orchestra) are superior to any in Europe; each costs over $600,000 a year.

None of them ever makes a red cent.

From "America's Symphony Orchestras".

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For years U.S. paint manufacturers have tried to sell homeowners the virtues of paint instead of wallpaper. Their difficulty was that housewives couldn't visualize from a color card what their walls and trim would look like after paint was on. With wallpaper they could take home sample books and see for themselves. To overcome this handicap, Cleveland's big Sherwin-Williams Co. launched an ambitious $250,000 project. Last week in the hands of the No. 1 U.S. paintmaker's 6,300 dealers were the results--25,000 copies of a big (over 2 sq. ft.) heavy (7 lb. 6 oz.) costly ($10) style guide. Designed to replace the old color chart, its 256 color plates showed houses, living rooms, kitchens, bedrooms, etc.,

in coats of many colors. Each oversize plate was an extraordinarily clear and detailed color photograph of an actual paint job.

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The Harvard Lampoon chose "Oomph Girl" Ann Sheridan as movie actress most unlikely to succeed. Said she in Hollywood, where she earns approximately $100,000 a year: "I wonder what those bozos think is success...I don't mind criticism, but I hate to have it come from Harvard...I met a Harvard man once, myself. It was a very sad evening..."

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Mayor Maury Maverick of San Antonio, Texas, defined economics: "Whether you eat or not, and that is all."

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Gasoline stocks rose again last week, hit 98,364,000 barrels, an all-time high. An important reason: demand for fuel oil, normally a by-product of gasoline, continued to rise. Now gasoline has become virtually a by-product of fuel oil because refiners are compelled to make more and more unwanted gasoline in order to fill their fuel oil orders. To help move surplus gasoline, Socony-Vacuum Oil Co., Inc., cut Mobilgas from 12-1/2¢ to 12¢.

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Four more Hardy pictures were made and Mickey Rooney found himself with an income of some $1,000 a week and $10,000 bonus per picture. In rapid succession he acquired a list of things, some of which are listed herewith: a ranch, a race horse, a twelve-room house, 19 radios, a jazz band, two dogs, a junior singles tennis championship of the Pacific Southwest, a wardrobe like Clark Gable's, two automobiles, a hide-away apartment in Beverly Hills, a football team, a colored valet, a collection of pipes, a golf score in the 80's, an Oscar, the authorship of three nationally popular songs, a guitar, saxophone and two pianos, a set of stooges including two U.S.C. football players, a kiss from Bette Davis, a crown from Ed Sullivan, a broken leg, 80 chickens, three turkeys, three ducks, three geese, six canaries and a parrot.

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Year ago a shrewd, rich St. Petersburg, Fla., real estate promoter named C. M. Washburn picked up a sub-tropical island for a figurative song. Three hundred acres of tangled mangrove, pine, palm and sand beach 23 miles northwest of Tampa, called Hog Island by the natives. He offered U.S. newlyweds free two-week honeymoons in the Gulf Coast paradise. In no time they had hit him with applications for some 2,000 suites. Re-christened Honeymoon Isle, Washburn laid out $15,000 to clean up the island, build shacks and a recreation hall. Last week the first couple moved into one of a row of board huts, not much bigger than bathing houses but thatched over to give them a romantic air. By June 1st Washburn expects to have enough huts to accommodate 50 handpicked couples every two weeks. Meantime he has been flooded with offers. A bus company is willing to put up $5,000 for the sight-seeing concession. A $2,000 offer for the beer concession was scorned with the explanation: "If you were to start a new business, you wouldn't prepare for it by getting drunk every night."

After the honeymoon season the city of Tampa is interested in taking over the island for a tourist playground. One unromantic newspaper photographer visited the Isle and wryly observed: "Not a thing on the island but huts, soldier crabs and pelicans. It's going to be tough if they don't know how to play cards."

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In ten years of depression we've got Streamline trains, Television, Transoceanic passenger air service, Synthetic rubber, Fluorescent lighting, Colored home movies, New plywoods, Half a dozen new plastics and resins, Polarized glass, Glass building blocks, Fiber glass insulation and textiles, Synthetic hosiery, Synthetic vitamins and hormones, Sulfanilamide and sulfapyridine. We have also reached and passed an all-time high in Industrial Production and Circulation of Money.

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Oklahoma City traffic sign: Drive slow. Help keep our streets clean.

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Curves & Angles

Perhaps it is getting a bit late for bits of this and that about skiing, although quite a few are still at it, but we think the following deserves a few lines in our column:

I think that I shall never see
A stick as tricky as a ski.
Steer the darn thing as I will,
It always rides me to a spill.
It lies all quiet till I'm on
Then without notice we are gone.

Down, down we run, I'm filled with glee;
My God! I'm sunk! Here comes a tree!
It's got me telemarked - I'm back for more.
Those are my waxed ones by the door.
Only God can make a tree--
But who in hell first made a ski?

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Peg O'Grady is back from California, not exactly down to earth yet, but having a lot of fun reminiscing and telling us all about the things she did down there. She didn't miss a trick, and did everything from visiting Mickey Rooney's home to watching Seabiscuit take top money in the Santa Anita races. Is she the envy of everyone! What do you think?

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Helen Finn Jones, our very obliging telephone operator for the past three years, has resigned in favor of housekeeping. Ruth Skinner, of the Mail & Files, is taking her place on the board.

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My, my, is this appendectomy fad ever going to cease! Marie Myles, of the Planning Survey, is the latest victim. However, she is now back at work again and looks very fit.

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Edith Devlin, of the Accounting Division, has discarded her crutches after hobbling around on them for about a week. No, they didn't result from a skiing accident, but rather from an operation on her foot.

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Mary Morris, of the Bituminous Division, has already been doing a little golfing. We'll bet that it won't be long until Florence Reeser is trying out the greens, too.

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Eve Kraft, of the Planning Survey, says that "smooching" doesn't mean the same in that department as it does in her vocabulary.

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Mrs. Bevan has been assisting in the Right of Way Division during a rush season.

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Did you know that we have a "Gable" and a "Loy" in the Planning Survey. Well, we have.

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At its second annual meeting, the Mother-in-Law Association of Saks Thirty-Fourth Street, Manhattan department store, gave four judges the task of choosing a word to replace "mother-in-law". Several hundred entries, including Motherette, Mother Rat, Ersatz Mother, Blitzkrieg Mother, Mother-link, were discarded in favor of "Kin-Mother".

Commented Lexicographer Funk: " These synthetic words...seldom catch on."

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(Ed: Even curves & angles is getting skimpy)

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MATERIALS LABORATORY PROGRESS REPORT
ON
AN INVESTIGATION OF THE ADHESIVITY OF
BITUMINOUS MATERIALS TO LOCALLY AVAILABLE AGGREGATES
IN THE PRESENCE OF MOISTURE

PART FIVE

The strip test is our only criterion positive enough to determine, (1) the degree of adhesivity of a natural aggregate, and (2) the amount of chemical treatment necessary to change an aggregate with poor adhesivity into a hydrophobic one.

In the investigations carried out on the chemical treatment of aggregates, the most work was centered on crushed material for the following reasons:

(1) Crushed material showed definitely poorer results than the natural.

(2) Top course surfacing samples from road construction show that the final mix is composed of from 65 to 100% crushed material.

Several methods were used to attack this problem:

(1) Titration to end point using solutions of the reagents.

250 gr. samples graded to the mean of our specifications were treated cold with 5% straight run slow-curing road oil. Then alternate applications of 0.05 M activator and collector were added, until the end point was reached. The end point is definite within limits of 1 cc. of solution, and is distinguished by the change of the excess solution from muddy and oily, to clear and water-like. The clear solution is then drained off, and the resultant mix is warmed and dried at the lowest temperature necessary to completely coat all particles upon further mixing. The final mix is then allowed to air cure over night, and then subjected to the regular strip procedure.

(2) Pre-treatment of the bituminous binder with both activator and collector:

Definite amounts of activator and collector were added to the oil, varying the temperature at the time of applying the reagents. This oil was then used as the binding medium in the regular aggregate mix, with the temperature held within limits between 200°F and 240°F.

(3) Pretreating the bituminous binder with either activator or collector separately:

The same procedure as in pretreating the oil with both activator and collector was used. This oil was then used in the regular hot mix.

(4) Pretreeting the bituminous binder with a metal-organic soap directly:

This treatment was used to note the effect of the usual reaction product, not depending upon its formation in the final mix. Various percentages of the compound were dissolved in the oil at varying temperatures and this oil was then used in the regular hot mix.

(5) Treating aggregate with solution of activator alone:

The solution of activator was added directly to the aggregate and then mixed thoroughly. The activated aggregate was then dried, heated to 200°F, and oiled with either straight road oil, or with an oil to which a collector had been added.

As to the feasibility of applying these different treatment methods to field practice, the most desirable way to handle No. 1, wet treatment, would be to plant mix with the addition of a pug mill in which to wet treat the aggregate. Numbers 2, 3 and 4 would be the simplest from the standpoint of field application. The bituminous binder could be treated at one of several places, preferably at the starting point of delivery, or right at the field of operations.

Number 5 could be utilized as the ordinary road mix. The solution of activator could be sprayed on aggregate and bladed in, allowed to dry, after which the oil, whether treated or plain, could be mixed in as usual. This method would involve the extra blading necessary to coat the aggregate with activator, but even so, offers the most feasible method of application where such a treatment is successful.

Regardless of which of the above methods was used, if treatment was successful there was a formation of a metal organic, water-insoluble compound on the inter-face between the aggregate and the oil. For instance, in the case of $Pb(NO_3)_2$ as activator and oleic acid as collector, the bivalent Pb^{++} is adsorbed on the mineral surface, and it reacts with the fatty acid radical of the collector to form the organic compound Pb Oleate, allowing 1 free valence bond to adhere to the mineral surface, thus creating a bond between the oil and aggregate that is extremely water resistant.

The strip results on the chemically treated aggregates, as can be seen in the data that follows, show the high degree of adhesivity achieved in the final mix. No separation of any particles from any fraction of the final mix is noted, either upon the initial 24-hour stirring or upon subsequent stirrings over immersion periods of several weeks. This was especially true of those aggregates which were completely treated to an endpoint in the wet method, using both activator and collector.

The results of partial treatment, using either the activator alone in a given aggregate or the collector alone in a given oil varied, as was expected, for the success of this treatment depends upon the natural constituents present in the aggregate or the oil. (Refer to "dry treatment" table on project 60).

Due to the fact that aggregate types vary in their properties and susceptibility to chemical treatment, it was deemed advisable to deal with a particular type as a separate problem. For example, the aggregate from project 60 is derived from volcanic intrusive rhyolitic to andesitic porphyrys. This aggregate is completely different from types investigated

from other projects.

The original laboratory tests on 57 preconstruction samples from project 60 showed ranges as follows:

	Natural	Manufactured
Swell	0.0035 - 0.0250	0.0027 - 0.0300
Water Asphalt Preferential Strip	0 - 40 Fair to Very Poor	30 - 50 Poor to Very Poor

This type of aggregate contains very little basic material and is high in Na and K feldspars. No past or present activation by polyvalent ions is evident and the poor results tabulated above result.

The results of chemical treatment on the aggregate from this project are tabulated in the two tables (labeled project #60) immediately following.

This particular aggregate was amenable to treatment with $Pb(NO_3)_2$ and Na Oleate, but did not show results as satisfactory as when $FeCl_3$ was used as activator and oleic acid as collector. The treatment with $FeCl_3$ and oleic acid gave best results when comparable amounts of each reagent are used, which brought the pH value to the neutral point.

Attempts were made to activate the aggregate with the natural Fe compound hematite, which, if it had been successful, would have been very satisfactory for field practice. However, the Fe content could not be utilized while non-water-soluble, and metallurgical flotation practice has found that hematite itself must be activated before it can be coated with oil.

The treatment with $FeCl_3$ as activator, but with no collector added, shows that this aggregate may be activated if a sufficient amount is added. It also shows that a certain amount of collector agencies exist in the oil used.

Experiments were conducted in treating the bituminous binder with either or both activator and collector, and using this treated oil in a mix with the aggregate from project 60 under regular road mix procedure. The results show that with the proper relationship of activator and collector in the oil, it is possible to improve vastly the adhesivity of the oil for this type of aggregate.

The addition of an activator $\left(Pb(NO_3)_2\right)$ alone in the oil did not benefit the mix at all. The addition of collector in form of oleic acid in the oil improved the adhesivity a great deal. The best treatment, however, was the addition of collector and activator together in the oil, in the relationship of four tenths of one percent activator and 2% collector.

The addition of Pb Oleate (the reaction product of $Pb(NO_3)_2$ and oleic acid) directly to the oil improved the adhesivity. This shows that it is not necessary to cause the reaction between activator and collector to take place during the mix treatment, but that the metal-organic soap itself will form a water resistant bond on the interface between the mineral surface and the oil.

PROJECT #60 $Pb(NO_3)_2$ - 0.3M
Na Oleate - 0.05M
$FeCl_3$ $6H_2O$ - 0.05M
Oleic Acid - 20 drops equivalent to 36 cc. - 0.05M

TITRATION TO END POINT

Oil	ACTIVATOR Kind	Amount	COLLECTOR Kind	Amount	STRIP Test	Remarks
Sc-3 12 gm.	$Pb(NO_3)_2$	0.048 gm.	-	-	Very Poor	No natural collector in the oil.
14 gm. Sc-3	$Pb(NO_3)_2$	18 cc.	Na Oleate	16cc	Good	Evaporated till good coating was achieved.
12 gm. SC-2	Fe Cl_3 6 H_2O	33cc	Oleic Acid	20 drops (36 cc.)	Very Good	To zero end point. Dried to complete coating & stripped pH - 7.0.
12 gm. S -2	Fe Cl_3 6 H_2O	75 cc.	"	18 cc.	Very Good	To zero end point. Dried to complete coating and stripped pH - 6.8.
12 gm. SC-2	Fe Cl_3 6 H_2O	60 cc.	Oleic Acid	18 cc.	Very Good	To zero end point. pH-6.0 at end point but brought up to 7.0 with NaOH.

DRY TREATMENTS

Oil	ACTIVATOR Kind	Amount	COLLECTOR Kind	Amount	STRIP Test	Remarks
12 gm. SC-3	$FeCl_3$ 6 H_2O	60 cc.	Oleic Acid	0.24 gm	Very Good	Oleic Acid added to oil before mixing. $FeCl_3$ - 6 H_2O added to aggregate, mixed and dried.
12 gm. SC-3	$FeCl_3$ 6 H_2O	60 cc.			Poor	Same treatment as above but with no collector.
12 gm. SC-3	$FeCl_3$ 6 H_2O	120 cc.	-	-	F - Fair C - Good	Same treatment as above.
12 gm. SC-3					Very Poor	Complete strip. 5 gm. hematite (27.5% Fe) added dry to aggregate before oiling.
12 gm. SC-3					Very Poor	Complete Strip. 0.75 grm. hematite (27.5% Fe) added to aggregate before mix.

PROJECT #60 DRY TREATMENTS

Oil	ACTIVATOR Kind	Amount	COLLECTOR Kind	Amount	STRIP Test	Remarks
SC-3 13 gm.	$Pb(NO_3)_2$	0.4% in oil			Very Poor	Activator added to oil at 200°
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in oil			Very Poor	Activator added to oil at 300°
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in Oil			Very Poor	Activator added to oil at 400°
SC-3 13 gm.			Oleic Acid	1%	F - Poor C - Fair	Acid Diss.in oil
SC-3 12 gm.			Oleic Acid	2%	Good	Acid diss. in oil
SC-3 12 gm.			Oleic Acid	4%	F - Fair C - Good	Acid diss.in oil
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in oil	Oleic Acid	1%	F - Poor C - Fair	Reagents dissolved in oil.
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in oil	Oleic Acid	2%	Very Good	Reagents dissolved in oil.
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in oil	Oleic Acid	4%	Good	Reagents dissolved in oil.
SC-3 12 gm.	Pb (Oleate)	1%			Fair	Reagents dissolved in oil.
SC-3 12 gm.	Pb (Oleate)	2%			F - Fair C - Good	Reagents dissolved in oil.
SC-3 12 gm.	Pb (Oleate)	4%			Good	Reagents dissolved in oil.

The aggregate type from project 65-A is composed of a mixture of moderately hard limestones, sandstones, quartzites, shales and sandy clays, derived chiefly from the upper cretaceous.

Test results on 23 preconstruction samples from this area showed ranges in results as follows:

	Natural	Manufactured
Swell	0.0050-0.0325	0.0070-0.0350
W.A.P.	20 - 50	0 - 40
Strip	Poor/Good-Very Poor	Poor-Very Poor

The poor results above are due to the alkali-forming cementing material in the aggregate.

The best results in chemical treatment were obtained in titration to the end point in the wet method, using $Pb(NO_3)_2$ as the activator and either

oleic acid or Na Oleate as the collector. In this treatment, a comparison of straight run and cracked oils was made, and it was found that with the same amount of reagents, no difference was noted.

When treating this aggregate with activator alone ($FeCl_3$), it was found that when the activated mix was dried, heated to 200° F. and then oiled, an increase in adhesion was noted. However, when the oil was added to the wet mix with the activator, an emulsion was formed. When this was oven dried and remixed, the resultant strip was poor.

When the aggregate was treated with an activator, then oven dried, and oiled at 200° F. with an oil treated with a collector, the strip was good.

Treatment of the oil with an activator alone did not benefit the mix. In contrast to project 60, this aggregate was not benefited by treating the oil with a collector alone. With both activator and collector in the oil, however, a change was noted, the best result occuring when 0.4% $Pb(No_3)_2$ and 0.48 gr. of oleic acid were added to the oil. This change was not as pronounced as in the project 60 aggregate, as comparison of the charts show.

Results of treating oil with PB Oleate (combined activator and collector) were good, although a little less satisfactory than separate use of activator and collector in the wet treatment method.

PROJECT #65-A	TITRATION TO END POINT					
	ACTIVATOR		COLLECTOR		STRIP	
Oil	Kind	Amount	Kind	Amount	Rat	Remarks
SC-2			Oleic			pH-5.4
12 gm.	$Pb(NO_3)_2$	18 cc.	Acid	29.5cc.	Very Good	
SC-2			Oleic	31.25 gr.		Oleic acid was added to oil befor titration. (1) Oleic acid must be added simultaneously with activator. (2) Excess reagent seam to be necess to control pH.
9.5 gr.	$Pb(NO_3)_2$	66 cc.	Acid	(12.5% oil)	Very Good pH-5.0	
Home SC 3	$Pb(NO_3)_2$	40 cc.	Na Oleate	40 cc.	Very Good	In comparison of cracked and straig run oils, both gav very good results using same quanti-ties of identical reagents.
Y ale SC-3 12 gm	$Pb(NO_3)_2$	40 cc.	NA Oleate	40 cc	Very Good	

DRY TREATMENTS

	ACTIVATOR		COLLECTOR		STRIP	
Oil	Kind	Amount	Kind	Amount		Remarks
SC-3 12 Gm.	$FeCl_3$ 6 H_2O	30 cc			F - Fair G - Good	Improved aggregate by addition of $FeCl_3$ only
SC-3 12 gm.	$FeCl_3$ 6 H_2O	32 cc			Very Poor	Added oil to wet aggregate - emulsion formed. The oven dried & mixe
SC-3 12 gm.	$Pb(NO_3)_2$	27 cc.	Oleic Acid	0.423 gr.	F - Fair to Good C - Good	Added $Pb(NO_3)_2$, dried at 202° F, then oiled with SC-3 to which the Oleic Acid had been added.
SC-3 12 gm.	$Pb(NO_3)_2$	0.4% in oil	-	-	Very Poor	Activator added t oil at 200°F.
SC-3 12 gm.	$PB(NO_3)_2$	0.4% in oil			Very Poor	Activator added to oil at 300°.
SC-3 12 gm.	$Pb(NO_3)$	0.4% in oil			Very Poor	Activator added to oil at 400°.
SC-3 12 gm			Oleic Acid	0.12 gm.	Poor	Acid diss. in oil.
SC-3 12 gm.			Oleic Acid	0.25 gm.	Poor	Acid diss. in oil.
SC-3 12 gm.			Oleic Acid	0.48 gm.	Poor	Acid diss. in oil.
SC-3 12 gm.	$PB(NO_3)_2$	0.4% in oil	Oleic Acid	0.12 gm.	Poor	Reagents diss. in oil
SC-3 12 gm.	$PB(NO_3)_2$	0.4% in oil	Oleic Acid	0.24 gm.	F-Poor C-Fair	Reagents diss. in oil.
SC 3 12 gm.	$PB(NO_3)_2$	0.4% in oil	Oleic Acid	0.48 gm.	F-Poor C-Good	Reagents diss. in oil.
SC-3 12 gm.	PbOleate	0.12 gm.			F-Poor C-Fair	Reagents diss. in oil.
SC-3 12 Gm.	PbOleate	0.24 gm.			Good	Reagents diss. in oi
SC-3 12 gm.	PbOleate	0.48 gm.			Good	Reagents diss. in oil

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